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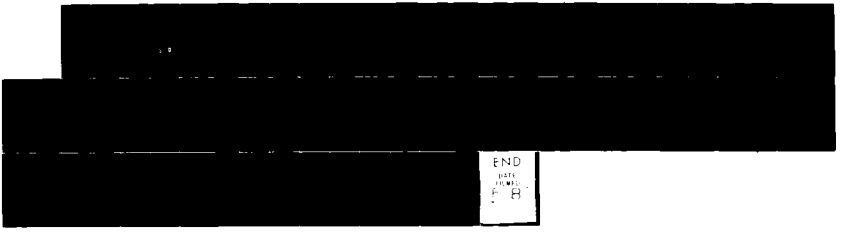

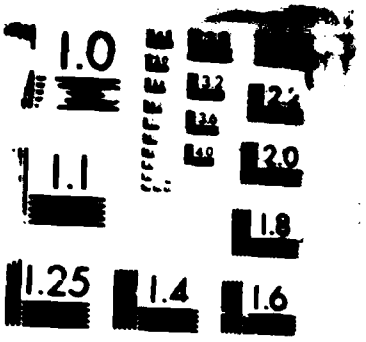
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REPORT DOCUMENTATION PAGE

1. REPORT NUMBER / 2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Ada Compiler Validation Summary Report: IBM Corp., IBM Dev. System for the Ada Language for MVS, Ver. 1.0, IBM 4381 (IBM System/370) under MVS	5. TYPE OF REPORT & PERIOD COVERED 5 MAY 1986 to 5 MAY 1987 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Wright-Patterson	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION AND ADDRESS Ada VAlidation Facility ASD/SIOL Wrigh -Patterson AFB OH 45433-6503	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Ada Joint Program Office United States Department of Defense Washington, DC 20301-3081ASD/SIOL	12. REPORT DATE 5 MAY 1986 13. NUMBER OF PAGES 31
14. MONITORING AGENCY NAME & ADDRESS(If different from Controlling Office) Wright-Patterson	15. SECURITY CLASS (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20. If different from Report)

UNCLASSIFIED

18. SUPPLEMENTAR NOTES

19. KEYWORDS (Continue on reverse side if necessary and identify by block number)

Ada Programming language, Ada Compiler Validation Summary Report, Ada Compiler Validation Capability, ACVC, Validation Testing, Ada Validation Office, AVO, Ada Validation Facility, AVF, ANSI/MIL-STD-1815A, Ada Joint Program Office, AJPO

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

See Attached.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Ada® Compiler Validation Summary Report:

Compiler Name: IBM Development System for the Ada Language
for MVS, Version 1.0

Host Computer:	Target Computer:
IBM 4381 (IBM System/370)	IBM 4381 (IBM System/370)
under	under
MVS	MVS
release 3.8	release 3.8

Testing Completed 5 MAY 1986 Using ACVC 1.7

This report has been reviewed and is approved.

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AVF Control Number: AVF-VSR-36.0187

Ada® COMPILER
VALIDATION SUMMARY REPORT:
International Business Machines Corporation
IBM Development System for the Ada Language for MVS,
Version 1.0
IBM 4381 (IBM System/370)
under MVS

Completion of On-Site Validation:
5 MAY 1986

Prepared By:
Ada Validation Facility
ASD/SIOL
Wright-Patterson AFB OH 45433-6503

Prepared For:
Ada Joint Program Office
United States Department of Defense
Washington, D.C.

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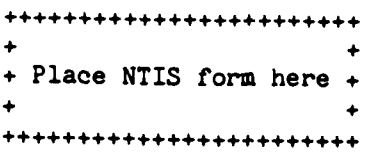
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EXECUTIVE SUMMARY

This Validation Summary Report (VSR) summarizes the results and conclusions of validation testing performed on the IBM Development System for the Ada Language for MVS, Version 1.0, using Version 1.7 of the Ada® Compiler Validation Capability (ACVC).

The validation process includes submitting a suite of standardized tests (the ACVC) as inputs to an Ada compiler and evaluating the results. The purpose is to ensure conformance of the compiler to ANSI/MIL-STD-1815A Ada by testing that it properly implements legal language constructs and that it identifies and rejects illegal language constructs. The testing also identifies behavior that is implementation dependent but permitted by ANSI/MIL-STD-1815A. Six classes of tests are used. These tests are designed to perform checks at compile time, at link time, or during execution.

On-site testing was performed 28 APR 1986 through 5 MAY 1986 in San Diego CA, under the direction of the Ada Validation Facility (AVF), according to Ada Validation Organization (AVO) policies and procedures. The IBM Development System for the Ada Language for MVS, Version 1.0, is hosted on an IBM 4381 operating under MVS release 3.8.

The results of validation are summarized in the following table:

RESULT	TEST CLASS						TOTAL
	A	B	C	D	E	L	
Passed	66	820	1012	16	9	21	1944
Failed	0	0	0	0	0	0	0
Inapplicable	2	4	308	1	2	2	319
Withdrawn	0	4	12	0	0	0	16
TOTAL	68	828	1332	17	11	23	2279

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There were 16 withdrawn tests in ACVC Version 1.7 at the time of this validation attempt. A list of these tests appears in Appendix D.

Some tests demonstrate that some language features are or are not supported by an implementation. For this implementation, the tests determined the following:

- SHORT_FLOAT is not supported.
- LONG_FLOAT is not supported.
- The additional predefined types SHORT_INTEGER and LONG_INTEGER are supported. LONG_INTEGER is predefined but has the same range as INTEGER; this violates the Ada Standard 3.5.4(7). See section 3.8.
- Representation specifications for noncontiguous enumeration representations are not supported.
- The 'SIZE clause is not supported.
- The 'STORAGE_SIZE clause for an access type is not supported.
- The 'SMALL clause is not supported.
- Generic unit specifications and bodies cannot be compiled in separate compilations.
- Pragma INLINE is not supported for procedures or functions.
- The package SYSTEM is used by package TEXT_IO.
- Modes IN_FILE and OUT_FILE are supported for sequential I/O.
- Instantiation of the package SEQUENTIAL_IO with unconstrained array types is not supported.
- Instantiation of the package SEQUENTIAL_IO with unconstrained record types with discriminants without default values is not supported.
- RESET and DELETE are supported for sequential and direct I/O.
- Modes IN_FILE, INOUT_FILE, and OUT_FILE are supported for direct I/O.
- Instantiation of package DIRECT_IO with unconstrained array types and unconstrained types with discriminants without default values is not supported.

- Dynamic creation and deletion of files are supported.
- More than one internal file can be associated with the same external file for reading only.
- Illegal file names can exist.

ACVC Version 1.7 was taken on-site via magnetic tape to San Diego CA. All tests, except the withdrawn tests and any executable tests that make use of a floating-point precision greater than SYSTEM.MAX_DIGITS, were compiled on an IBM 4381. Class A, C, D, and E tests were executed on an IBM 4381.

On completion of testing, execution results for Class A, C, D, or E tests were examined. Compilation results for Class B tests were analyzed for correct diagnosis of syntax and semantic errors. Compilation and link results of Class L tests were analyzed for correct detection of errors.

The AVF identified 1985 of the 2279 tests in Version 1.7 of the ACVC as potentially applicable to the validation of the IBM Development System for the Ada Language for MVS, Version 1.0. Excluded were 278 tests requiring a floating-point precision greater than that supported by the implementation and the 16 withdrawn tests. After the 1985 tests were processed, 41 tests were determined to be inapplicable. The remaining 1944 tests were passed by the compiler.

The AVF concludes that these results demonstrate acceptable conformance to ANSI/MIL-STD-1815A.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

This Validation Summary Report (VSR) describes the extent to which a specific Ada compiler conforms to ANSI/MIL-STD-1815A. This report explains all technical terms used within it and thoroughly reports the results of testing this compiler using the Ada Compiler Validation Capability (ACVC). An Ada compiler must be implemented according to the Ada Standard (ANSI/MIL-STD-1815A). Any implementation-dependent features must conform to the requirements of the Ada Standard. The entire Ada Standard must be implemented, and nothing can be implemented that is not in the Standard.

Even though all validated Ada compilers conform to ANSI/MIL-STD-1815A, it must be understood that some differences do exist between implementations. The Ada Standard permits some implementation dependencies--for example, the maximum length of identifiers or the maximum values of integer types. Other differences between compilers result from limitations imposed on a compiler by the operating system and by the hardware. All of the dependencies demonstrated during the process of testing this compiler are given in this report.

VSRs are written according to a standardized format. The reports for several different compilers may, therefore, be easily compared. The information in this report is derived from the test results produced during validation testing. Additional testing information as well as details which are unique for this compiler are given in section 3.7. The format of a validation report limits variance between reports, enhances readability of the report, and minimizes the delay between the completion of validation testing and the publication of the report.

1.1 PURPOSE OF THIS VALIDATION SUMMARY REPORT

This VSR documents the results of the validation testing performed on an Ada compiler. Testing was carried out for the following purposes:

- To attempt to identify any language constructs supported by the compiler that do not conform to the Ada Standard

- To attempt to identify any unsupported language constructs required by the Ada Standard
- To determine that the implementation-dependent behavior is allowed by the Ada Standard

Testing of this compiler was conducted by SofTech, Inc., under the direction of the AVF according to policies and procedures established by the Ada Validation Organization (AVO). Testing was conducted from 28 APR 1986 through 5 MAY 1986 in San Diego CA.

1.2 USE OF THIS VALIDATION SUMMARY REPORT

Consistent with the national laws of the originating country, the AVO may make full and free public disclosure of this report. In the United States, this is provided in accordance with the "Freedom of Information Act" (5 U.S.C. #552). The results of this validation apply only to the computers, operating systems, and compiler versions identified in this report.

The organizations represented on the signature page of this report do not represent or warrant that all statements set forth in this report are accurate and complete, or that the subject compiler has no nonconformances to ANSI/MIL-STD-1815A other than those presented. Copies of this report are available to the public from:

Ada Information Clearinghouse
Ada Joint Program Office
OUSDRE
The Pentagon, Rm 3D-139
1211 S. Fern, C-107
Washington DC 20301-3081

or from:

Ada Validation Facility
ASD/SIOL
Wright-Patterson AFB OH 45433-6503

Questions regarding this report or the validation test results should be directed to the AVF listed above or to:

Ada Validation Organization
Institute for Defense Analyses
1801 North Beauregard
Alexandria VA 22311

1.3 RELATED DOCUMENTS

1. Reference Manual for the Ada Programming Language, ANSI/MIL-STD-1815A, FEB 1983.
2. Ada Validation Organization: Policies and Procedures, MITRE Corporation, JUN 1982, PB 83-110601.
3. Ada Compiler Validation Capability Implementers' Guide, SofTech, Inc., DEC 1984.

1.4 DEFINITION OF TERMS

ACVC	The Ada Compiler Validation Capability. A set of programs that evaluates the conformance of a compiler to the Ada language specification, ANSI/MIL-STD-1815A.
Ada Standard	ANSI/MIL-STD-1815A, February 1983.
Applicant	The agency requesting validation.
AVF	The Ada Validation Facility. In the context of this report, the AVF is responsible for conducting compiler validations according to established policies and procedures.
AVO	The Ada Validation Organization. In the context of this report, the AVO is responsible for setting policies and procedures for compiler validations.
Compiler	A processor for the Ada language. In the context of this report, a compiler is any language processor, including cross-compilers, translators, and interpreters.
Failed test	A test for which the compiler generates a result that demonstrates nonconformance to the Ada Standard.
Host	The computer on which the compiler resides.

Inapplicable test	A test that uses features of the language that a compiler is not required to support or may legitimately support in a way other than the one expected by the test.
LMC	The Language Maintenance Committee whose function is to resolve issues concerning the Ada language.
Passed test	A test for which a compiler generates the expected result.
Target	The computer for which a compiler generates code.
Test	A program that evaluates the conformance of a compiler to a language specification. In the context of this report, the term is used to designate a single ACVC test. The text of a program may be the text of one or more compilations.
Withdrawn test	A test found to be inaccurate in checking conformance to the Ada language specification. A withdrawn test has an invalid test objective, fails to meet its test objective, or contains illegal or erroneous use of the language.

1.5 ACVC TEST CLASSES

Conformance to ANSI/MIL-STD-1815A is measured using the ACVC. The ACVC contains both legal and illegal Ada programs structured into six test classes: A, B, C, D, E, and L. The first letter of a test name identifies the class to which it belongs. Special program units are used to report the results of the Class A, C, D, and E tests during execution. Class B tests are expected to produce compilation errors, and Class L tests are expected to produce link errors.

Class A tests check that legal Ada programs can be successfully compiled and executed. (However, no checks are performed during execution to see if the test objective has been met.) For example, a Class A test checks that reserved words of another language (other than those already reserved in the Ada language) are not treated as reserved words by an Ada compiler. A Class A test is passed if no errors are detected at compile time and the program executes to produce a message indicating that it has passed.

Class B tests check that a compiler detects illegal language usage. Class B tests are not executable. Each test in this class is compiled and the resulting compilation listing is examined to verify that every syntactical or semantic error in the test is detected. A Class B test is passed if every illegal construct that it contains is detected by the compiler.

Class C tests check that legal Ada programs can be correctly compiled and executed. Each Class C test is self-checking and produces a PASSED, FAILED, or NOT-APPLICABLE message indicating the result when it is executed.

Class D tests check the compilation and execution capacities of a compiler. Since there are no requirements placed on a compiler by the Ada Standard for some parameters (e.g., the number of identifiers permitted in a compilation, the number of units in a library, and the number of nested loops in a subprogram body), a compiler may refuse to compile a Class D test and still be a conforming compiler. Therefore, if a Class D test fails to compile because the capacity of the compiler is exceeded, the test is classified as inapplicable. If a Class D test compiles successfully, it is self-checking and produces a PASSED or FAILED message during execution.

Each Class E test is self-checking and produces a NOT-APPLICABLE, PASSED, or FAILED message when it is compiled and executed. However, the Ada Standard permits an implementation to reject programs containing some features addressed by Class E tests during compilation. Therefore, a Class E test is passed by a compiler if it is compiled successfully and executes to produce a PASSED message, or if it is rejected by the compiler for an allowable reason.

Class L tests check that incomplete or illegal Ada programs involving multiple, separately compiled units are detected and not allowed to execute. Class L tests are compiled separately and execution is attempted. A Class L test passes if it is rejected at link time--that is, an attempt to execute the main program must generate an error message before any declarations in the main program or any units referenced by the main program are elaborated.

Two library units, the package REPORT and the procedure CHECK_FILE, support the self-checking features of the executable tests. The package REPORT provides the mechanism by which executable tests report results. It also provides a set of identity functions used to defeat some compiler optimization strategies and force computations to be made by the target computer instead of by the compiler on the host computer. The procedure CHECK_FILE is used to check the contents of text files written by some of the Class C tests for chapter 14 of the Ada Standard.

The operation of these units is checked by a set of executable tests. These tests produce messages that are examined to verify that the units are operating correctly. If these units are not operating correctly, then the validation is not attempted.

Some of the conventions followed in the ACVC are intended to ensure that the tests are reasonably portable without modification. For example, the tests make use of only the basic set of 55 characters, contain lines with a maximum length of 72 characters, use small numeric values, and place features that may not be supported by all implementations in separate tests. However, some tests contain values that require the test to be customized according to implementation-specific values. The values used for this validation are listed in Appendix C.

A compiler must correctly process each of the tests in the suite and demonstrate conformance to the Ada Standard by either meeting the pass criteria given for the test or by showing that the test is inapplicable to the implementation. Any test that was determined to contain an illegal

language construct or an erroneous language construct is withdrawn from the ACVC and, therefore, is not used in testing a compiler. The nonconformant tests are given in Appendix D.

CHAPTER 2

CONFIGURATION INFORMATION

2.1 CONFIGURATION TESTED

The candidate compilation system for this validation was tested under the following configuration:

Compiler: IBM Development System for the Ada Language for MVS, Version 1.0

Test Suite: Ada Compiler Validation Capability, Version 1.7

Host Computer:

Machine(s):	IBM 4381
Operating System:	MVS release 3.8
Memory Size:	16 megabytes

Target Computer:

Machine(s):	IBM 4381
Operating System:	MVS release 3.8
Memory Size:	16 megabytes

2.2 CERTIFICATE INFORMATION

Base Configuration:

Compiler: IBM Development System for the Ada Language for MVS, Version 1.0

Test Suite: Ada Compiler Validation Capability, Version 1.7

Certificate Date: 16 July 1986

Host Computer:

Machine(s):	IBM 4381 (IBM System/370)
Operating System:	MVS release 3.8

Target Computer:

Machine(s):	IBM 4381 (IBM System/370)
Operating System:	MVS release 3.8

2.3 IMPLEMENTATION CHARACTERISTICS

One of the purposes of validating compilers is to determine the behavior of a compiler in those areas of the Ada Standard that permit implementations to differ. Class D and E tests specifically check for such implementation differences. However, tests in other classes also characterize an implementation. This compiler is characterized by the following interpretations of the Ada Standard:

- Nongraphic characters.

  Nongraphic characters are defined in the ASCII character set but are not permitted in Ada programs, even within character strings. The compiler correctly recognizes these characters as illegal in Ada compilations. The characters are not printed in the output listing. (See test B26005A.)

- Capacities.

  The compiler correctly processes compilations containing loop statements nested to 65 levels, block statements nested to 65 levels, and recursive procedures nested to 10 levels. It correctly processes a compilation containing 723 variables in the same declarative part. (See tests D55A03A..H, D56001B, D64005E..G, and D29002K.)

- Universal integer calculations.

  An implementation is allowed to reject universal integer calculations having values that exceed SYSTEM.MAX_INT. This implementation does not reject such calculations and processes them correctly. (See tests D4A002A, D4A002B, D4A004A, and D4A004B.)

- Predefined types.

  This implementation supports the additional predefined types SHORT_INTEGER and LONG_INTEGER in the package STANDARD. (See tests B86001CR, B86001CS, B86001CP, B86001CQ, and B86001DT.) LONG_INTEGER is predefined but has the same range as INTEGER; this violates the Ada Standard 3.5.4(7). See section 3.8.

- Based literals.

  An implementation is allowed to reject a based literal with a value exceeding SYSTEM.MAX_INT during compilation, or it may raise NUMERIC_ERROR during execution. This implementation raises NUMERIC_ERROR during execution. (See test E24101A.)

- Array types.

When an array type is declared with an index range exceeding the INTEGER'LAST values and with a component that is a null BOOLEAN array, this compiler does not raise any exception. (See tests E36202A and E36202B.)

A packed BOOLEAN array having a 'LENGTH exceeding INTEGER'LAST raises NUMERIC_ERROR when the array type is declared. (See test C52103X.)

A packed two-dimensional BOOLEAN array with more than INTEGER'LAST components raises NUMERIC_ERROR when the array type is declared. (See test C52104Y.)

A null array with one dimension of length greater than INTEGER'LAST may raise NUMERIC_ERROR either when declared or assigned. Alternately, an implementation may accept the declaration. However, lengths must match in array slice assignments. This implementation raises NUMERIC_ERROR when the array type is declared. (See test E52103Y.)

In assigning one-dimensional array types, the entire expression appears to be evaluated before CONSTRAINT_ERROR is raised when checking whether the expression's subtype is compatible with the target's subtype.

In assigning two-dimensional array types, the entire expression does not appear to be evaluated before CONSTRAINT_ERROR is raised when checking whether the expression's subtype is compatible with the target's subtype. (See test C52013A.)

- Discriminated types.

  During compilation, an implementation is allowed to either accept or reject an incomplete type with discriminants that is used in an access type definition with a compatible discriminant constraint. This implementation accepts such subtype indications during compilation. (See test E38104A.)

  In assigning record types with discriminants, the entire expression appears to be evaluated before CONSTRAINT_ERROR is raised when checking whether the expression's subtype is compatible with the target's subtype. (See test C52013A.)

- Aggregates.

  In the evaluation of a multi-dimensional aggregate, the order in which choices are evaluated and index subtype checks are made appears to depend upon the aggregate itself. (See tests C43207A and C43207B.)

In the evaluation of an aggregate containing subaggregates, all choices are not evaluated before being checked for identical bounds. (See test E43212B.)

All choices are evaluated before CONSTRAINT_ERROR is raised if a bound in a nonnull range of a nonnull aggregate does not belong to an index subtype. (See test E43211B.)

- Functions.

  The declaration of a parameterless function with the same profile as an enumeration literal in the same immediate scope is rejected by the implementation. (See test E66001D.)

- Representation clauses.

  'SMALL length clauses are not supported. (See test C87B62C.)

  Enumeration representation clauses are not supported. (See test BC1002A.)

- Pragmas.

  The pragma INLINE is not supported for procedures or functions. (See tests CA3004E and CA3004F.)

- Input/output.

  The package SEQUENTIAL_IO cannot be instantiated with unconstrained array types and record types with discriminants without defaults. The package DIRECT_IO cannot be instantiated with unconstrained array types and record types with discriminants without defaults. (See tests CE2201D, CE2201E, and CE2401D.)

  More than one internal file can be associated with each external file for sequential I/O for reading only. (See tests CE2107A..F.)

  More than one internal file can be associated with each external file for direct I/O for reading only. (See tests CE2107A..F.)

  More than one internal file can be associated with each external file for text I/O for reading only. (See test CE3111A..E.)

  An existing text file can be opened in OUT_FILE mode, can be created in OUT_FILE mode, and can be created in IN_FILE mode. (See test EE3102C.)

  Temporary sequential files are given a name. Temporary direct files are given a name. Temporary files given names are deleted when they are closed. (See test CF?108A.)

CHAPTER 3

TEST INFORMATION

3.1 TEST RESULTS

The AVF identified 1985 of the 2279 tests in Version 1.7 of the ACVC as potentially applicable to the validation of the IBM Development System for the Ada Language for MVS, Version 1.0. Excluded were 278 tests requiring a floating-point precision greater than that supported by the implementation and the 16 withdrawn tests. After they were processed, 41 tests were determined to be inapplicable. The remaining 1944 tests were passed by the compiler.

The AVF concludes that the testing results demonstrate acceptable conformance to the Ada Standard.

3.2 SUMMARY OF TEST RESULTS BY CLASS

RESULT	TEST CLASS						TOTAL
	A	B	C	D	E	L	
Passed	66	820	1012	16	9	21	1944
Failed	0	0	0	0	0	0	0
Inapplicable	2	4	308	1	2	2	319
Withdrawn	0	4	12	0	0	0	16
TOTAL	68	828	1332	17	11	23	2279

3.3 SUMMARY OF TEST RESULTS BY CHAPTER

RESULT	CHAPTER												
	2	3	4	5	6	7	8	9	10	11	12	14	TOTAL
Passed	93	188	254	245	160	97	154	199	96	28	215	215	1944
Failed	0	0	0	0	0	0	0	0	0	0	0	0	0
Inapplicable	23	119	140	2	1	0	7	0	9	0	1	17	319
Withdrawn	0	1	4	0	0	0	1	2	6	0	1	1	16
TOTAL	116	308	398	247	161	97	162	201	111	28	217	233	2279

3.4 WITHDRAWN TESTS

The following tests have been withdrawn from the ACVC Version 1.7:

B4A010C	C41404A	CA1003B
B83A06B	C48008A	CA3005A..D (4 tests)
BA2001E	C4A014A	CE2107E
BC3204C	C92005A	
C35904A	C940ACA	

See Appendix D for the test descriptions.

3.5 INAPPLICABLE TESTS

Some tests do not apply to all compilers because they make use of features that a compiler is not required by the Ada Standard to support. Others may depend on the result of another test that is either inapplicable or withdrawn. For this validation attempt, 319 tests were inapplicable for the reasons indicated:

- C34001F, C35702A, and B86001CP use SHORT_FLOAT which is not supported by this compiler.
- C34001G, C35702B, and B86001CQ use LONG_FLOAT which is not supported by this compiler.
- C52008B declares a record type with four discriminants of type integer. The type may be used in the declaration of unconstrained objects, but the size of these objects exceeds the maximum object size of this implementation and CONSTRAINT_ERROR is raised.
- C55B16A makes use of an enumeration representation clause containing noncontiguous values which is not supported by this compiler.

- B86001DT requires a predefined numeric type other than those defined by the Ada language in package STANDARD. There is no such type for this implementation.

- C86001F redefines package SYSTEM, but TEXT_IO is made obsolete by this new definition in this implementation.

- C87B62A..C (3 tests) use length clauses to specify the collection size for an access type which is not supported by this compiler.

- CA1012A compiles generic subroutine declarations and bodies in separate compilation units. Separate compilation of generic specifications and bodies is not supported by this compiler.

- CA2009C and CA2009F compile generic subunits in separate compilation files. Separate compilation of generic specifications and bodies is not supported by this compiler.

- CA3004E, EA3004C, and LA3004A use INLINE pragma for procedures which is not supported by this compiler.

- CA3004F, EA3004D, and LA3004B use INLINE pragma for functions which is not supported by this compiler.

- BC3205D compiles generic subunits in separate compilation files. Separate compilation of generic specifications and bodies is not supported by this compiler.

- AE2101C, AE2101H, CE2201D, CE2201E, and CE2401D use instantiation of package SEQUENTIAL_IO with unconstrained array types which is not supported by this compiler.

- CE2107B..D (3 tests), CE2110B, CE2111D, CE2111H, CE3111B..E (3 tests), CE3114B, and CE3115A are inapplicable because multiple internal files cannot be associated with the same external file.

- D64005G is inapplicable because the compiler does not permit more than 15 levels of nested recursive procedures.

- 278 tests were not processed because SYSTEM.MAX_DIGITS was 6. These tests were:

C24113C..Y (23 tests)
C35705C..Y (23 tests)
C35706C..Y (23 tests)
C35707C..Y (23 tests)
C35708C..Y (23 tests)
C35802C..Y (23 tests)
C45241C..Y (23 tests)
C45321C..Y (23 tests)
C45421C..Y (23 tests)
C45424C..Y (23 tests)
C45521C..Z (24 tests)

C45621C..Z (24 tests)

3.6 SPLIT TESTS

If one or more errors do not appear to have been detected in a Class B test because of compiler error recovery, then the test is split into a set of smaller tests that contain the undetected errors. These splits are then compiled and examined. The splitting process continues until all errors are detected by the compiler or until there is exactly one error per split. Any Class A, Class C, or Class E test that cannot be compiled and executed because of its size is split into a set of smaller subtests that can be processed.

Splits were required for eight Class B tests.

B97101E	BA3007B	BA3013A
BA3006A	BA3008A	BA1101C
BA3006B	BA3008B	

3.7 ADDITIONAL TESTING INFORMATION

3.7.1 Prevalidation

Prior to validation, a set of test results for ACVC Version 1.7 produced by the IBM Development System for the Ada Language for MVS, Version 1.0, was submitted to the AVF by the applicant for prevalidation review. Analysis of these results demonstrated that the compiler successfully passed all applicable tests.

3.7.2 Test Method

Testing of the IBM Development System for the Ada Language for MVS using ACVC Version 1.7 was conducted on-site by a validation team. The base configuration consisted of an IBM 4381 host and target operating under MVS.

A magnetic tape containing ACVC Version 1.7 was taken on-site by the validation team. The magnetic tape contained all tests applicable to this validation, as well as all tests inapplicable to this validation except for any Class C tests that require floating-point precision exceeding the maximum value supported by the implementation. Tests that make use of values that are specific to an implementation were customized before being written to the magnetic tape. Tests requiring splits during the prevalidation testing were included in their split form on the magnetic tape. No editing of the test files was necessary when the validation team arrived on-site.

The contents of the magnetic tape were loaded directly onto the host computer. After the test files were loaded to disk, the full set of tests was compiled on the IBM 4381, and all executable tests were run on the IBM 4381. Tests withdrawn from ACVC Version 1.7 were not run.

The compiler was tested using command scripts provided by International Business Machines Corporation. These scripts were reviewed by the validation team.

Tests were run in batch mode using a single computer. Test output, compilation listings, and job logs were captured on magnetic tape and archived at the AVF. The listings examined on-site by the validation team were also archived.

3.7.3 Test Site

The validation team arrived in San Diego CA on 28 APR 1986 and departed after testing was completed on 5 MAY 1986.

3.8 ANOMALIES

One anomaly was discovered after the completion of testing; this implementation's predefined type LONG_INTEGER has exactly the same range as INTEGER. The Ada Standard 3.5.4(7) states that "An implementation may also have predefined types such as SHORT_INTEGER and LONG_INTEGER, which have (substantially) shorter and longer ranges, respectively, than INTEGER." However, there is no ACVC test that checks to see if this requirement is met, and this implementation's violation was not noticed until after testing was completed and a draft of this report was reviewed.

Given this nonconformity's late detection and superficial nature, the AVO does not deny validation to this implementation. However, it is recommended that the package STANDARD be corrected to exclude the declaration of LONG_INTEGER and associated subprograms. With such a corrected version of STANDARD, 5 tests passed during testing --viz., C34001E, B52004D, B55B09C, B86001CS, and C55B07A--, become inapplicable, for they contain declarations for objects of type LONG_INTEGER which must then be rejected.

APPENDIX A

COMPLIANCE STATEMENT

International Business Machines Corporation has submitted the following compliance statement concerning the IBM Development System for the Ada Language for MVS.

COMPLIANCE STATEMENT

Compliance Statement

Base Configuration:

Compiler: IBM Development System for the Ada Language (MVS)

Test Suite: Ada Compiler Validation Capability, Version 1.7

Host Computer:

Machine(s): IBM 4381 (System/370)

Operating System: MVS, release 3.8

Target Computer:

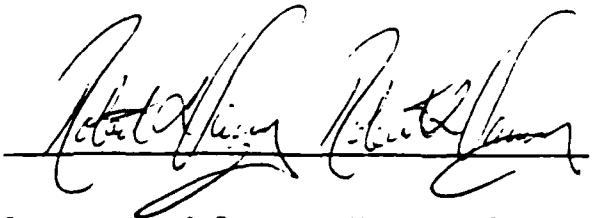
Machine(s): IBM 4381 (System/370)

Operating System: MVS, release 3.8

International Business Machines Corporation has made no deliberate extensions to the Ada language standard.

International Business Machines Corporation agrees to the public disclosure of this report.

International Business Machines Corporation agrees to continue to comply with the Ada trademark policy, as defined by the Ada Joint Program Office.



Date: SEPT 16/86

International Business Machines Corporation
R.L. Varney

APPENDIX B

APPENDIX F OF THE Ada STANDARD

The only allowed implementation dependencies correspond to implementation-dependent pragmas, to certain machine-dependent conventions as mentioned in chapter 13 of MIL-STD-1815A, and to certain allowed restrictions on representation classes. The implementation-dependent characteristics of the IBM Development System for the Ada Language for MVS, Version 1.0, are described in the following sections which discuss topics one through eight as stated in Appendix F of the Ada Language Reference Manual (ANSI/MIL-STD-1815A). Two other sections, package STANDARD and file naming conventions, are also included in this appendix.

F.1. Implementation-Dependent Pragmas

The compiler supports pragma COMMENT for inserting header information into source code.

F.2. Implementation-Dependent Attributes

There are no implementation-dependent attributes.

F.3. Package System Specification. The following is the specification of the package System for the compiler. (LRM 13.7)

```
package System is

  type Address is access integer;
  Null_Address : constant Address := null;

  subtype Byte is integer range 0 .. 255;

  type Integer_32 is range -(2**31) .. (2**31)-1;
  type Integer_16 is range -(2**15) .. (2**15)-1;

  type Name    is (mc68000, anuyk44, ibm370);

  System_Name  : constant name := ibm370;

  Storage_Unit : constant := 8;
  Memory_Size  : constant := 2**24-1;
```

```
   -- System-Dependent Named Numbers:

   Min_Int      : constant := -(2 ** 31);
   Max_Int      : constant := (2 ** 31) - 1;
   Max_Digits   : constant := 6;
   Max_Mantissa : constant := 31;
   Fine_Delta   : constant := 1.0 / (2 ** (Max_Mantissa - 1));
   Tick         : constant := 1.0 / (10 ** 6);

   -- Other System-Dependent Declarations

   subtype Priority is Integer range 0 .. 255;

   Max_Text_IO_Count : constant := Max_Int - 1;
   Max_Text_IO_Field : constant := 1000;

   type Display_Info is array (1 .. 17) of Address;

   type Subprogram_Value is record
                  Entry_Point_Address : Address;
                  Display : Display_Info;
                end record;

end System;
```

F.4. Representation Clause Restrictions

The following representation clauses are supported as defined in Chapter 13 of the LRM:

Address Clauses (13.5)

F.5. Implementation-Generated Name Conventions

There are no system-generated names for system-dependent components. (LRM 13.4)

F.6. Address Clause Expression Interpretation

Expressions that appear in address clauses, including those for interrupts, are interpreted as virtual memory addresses within the compiler. (LRM 13.5)

F.7. Unchecked Conversion Restrictions

Only non-private types of the same static size are supported for unchecked conversions.

F.8. Implementation-Dependent I/O Characteristics.

The compiler supports the predefined Text_IO package specified in the LRM [14] for formatted I/O. The compiler does not support Low_Level_IO for binary I/O. Sequential_IO and Direct_IO are supported, but the following types may not be instantiated for I/O:

Unconstrained array types
Unconstrained types with discriminants

. Package STANDARD

```
type INTEGER is range -(2**31) .. (2**31)-1;
type SHORT_INTEGER is range -(2**15) .. (2**15)-1;
type LONG_INTEGER is range -(2**31) .. (2**31)-1;

type FLOAT is digits 6 range -7.23693E+75 .. 7.23693E+75;

type DURATION is delta 2#1.0#E-14 range -86400.0 .. 86400.0;
```

. File Names

File names follow the conventions and restrictions of the target operating system.

APPENDIX C

TEST PARAMETERS

Certain tests in the ACVC make use of implementation-dependent values, such as the maximum length of an input line and invalid file names. A test that makes use of such values is identified by the extension .TST in its file name. Actual values to be substituted are identified by names that begin with a dollar sign. A value is substituted for each of these names before the test is run. The values used for this validation are given below.

Name and Meaning	Value
$BIG_ID1 Identifier of size MAX_IN_LEN with varying last character.	(1..199 => 'A', 200 => '1')
$BIG_ID2 Identifier of size MAX_IN_LEN with varying last character.	(1..199 => 'A', 200 => '2')
$BIG_ID3 Identifier of size MAX_IN_LEN with varying middle character.	(1..100 => 'A', 101 => '3', 102..200 => 'A')
$BIG_ID4 Identifier of size MAX_IN_LEN with varying middle character.	(1..100 => 'A', 101 => '4', 102..200 => 'A')
$BIG_INT_LIT An integer literal of value 298 with enough leading zeroes so that it is MAX_IN_LEN characters long.	(1..197 => '0', 198..200 => '298')

TEST PARAMETERS

Name and Meaning	Value
$BIG_REAL_LIT A real literal that can be either of floating- or fixed-point type, has value 690.0, and has enough leading zeroes to be MAX_IN_LEN characters long.	(1..194 => '0', 195..200 => '69.0E1')
$BLANKS Blanks of length MAX_IN_LEN - 20	(1..180 => ' ')
$COUNT_LAST Value of COUNT'LAST in TEXT_IO package.	2_147_483_645
$EXTENDED_ASCII_CHARS A string literal containing all the ASCII characters with printable graphics that are not in the basic 55 Ada character set.	"abcdefghijklmnopqrstuvwxyz!$%?@\`{}~"
$FIELD_LAST Value of FIELD'LAST in TEXT_IO package.	1_000
$FILE_NAME_WITH_BAD_CHARS An illegal external file name that either contains invalid characters or is too long.	"X}%!@#&~Y"
$FILE_NAME_WITH_WILD_CARD_CHAR An external file name that either contains a wild card character or is too long.	"XYZ*"
$GREATER_THAN_DURATION A universal real value that lies between DURATION'BASE'LAST and DURATION'LAST or any value in the range of DURATION.	86_401.0
$GREATER_THAN_DURATION_BASE_LAST The universal real value that is greater than DURATION'BASE'LAST.	131_072.0
$ILLEGAL_EXTERNAL_FILE_NAME1 Illegal external file name.	"BAD/CHARACTER*%@"
$ILLEGAL_EXTERNAL_FILE_NAME2 Illegal external file names.	(1..120 => 'A')

Name and Meaning	Value
$INTEGER_FIRST The universal integer literal expression whose value is INTEGER'FIRST.	-2**31
$INTEGER_LAST The universal integer literal expression whose value is INTEGER'LAST.	2**31-1
$LESS_THAN_DURATION A universal real value that lies between DURATION'BASE'FIRST and DURATION'FIRST or any value in the range of DURATION.	-86_401.0
$LESS_THAN_DURATION_BASE_FIRST The universal real value that is less than DURATION'BASE'FIRST.	-131_072.0
$MAX_DIGITS Maximum digits supported for floating-point types.	6
$MAX_IN_LEN Maximum input line length permitted by the implementation.	200
$NAME A name of a predefined numeric type other than FLOAT, INTEGER, SHORT_FLOAT, SHORT_INTEGER, LONG_FLOAT, or LONG_INTEGER.	(No such numeric type, used LONG_INTEGER)
$NEG_BASED_INT A based integer literal whose highest order nonzero bit falls in the sign bit position of the representation for SYSTEM.MAX_INT.	16#FFFFFFFE#
$NON_ASCII_CHAR_TYPE An enumerated type definition for a character type whose literals are the identifier NON_NULL and all non-ASCII characters with printable graphics.	(NON_NULL)

APPENDIX D

WITHDRAWN TESTS

Some tests are withdrawn from the ACVC because they do not conform to the Ada Standard. When testing was performed, the following 16 tests had been withdrawn at the time of validation testing for the reasons indicated:

- B4A010C: The object_declaration in line 18 follows a subprogram body of the same declarative part.

- B83A06B: The Ada Standard 8.3(17) and AI-00330 permit the label LAB_ENUMERAL of line 80 to be considered a homograph of the enumeration literal in line 25.

- BA2001E: The Ada Standard 10.2(5) states: "Simple names of all subunits that have the same ancestor library unit must be distinct identifiers." This test checks for the above condition when stubs are declared. However, the Ada Standard does not preclude the check being made when the subunit is compiled.

- BC3204C: The file BC3204C4 should contain the body for BC3204C0 as indicated in line 25 of BC3204C3M.

- C35904A: The elaboration of subtype declarations SFX3 and SFX4 may raise NUMERIC_ERROR (instead of CONSTRAINT_ERROR).

- C41404A: The values of 'LAST and 'LENGTH are incorrect in IF statements from line 74 to the end of the test.

- C48008A: This test requires that the evaluation of default initial values not occur when an exception is raised by an allocator. However, the Language Maintenance Committee (LMC) has ruled that such a requirement is incorrect (AI-00397/01).

WITHDRAWN TESTS

- C4A014A: The number declarations in lines 19-22 are incorrect because conversions are not static.

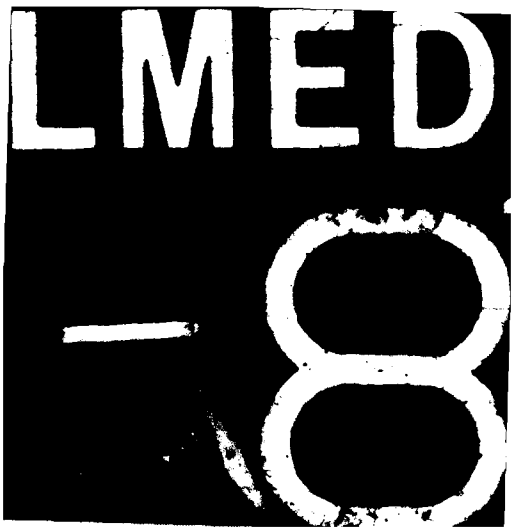
- C92005A: At line 40, "/=" for type PACK.BIG_INT is not visible without a USE clause for package PACK.

- C940ACA: This test assumes that allocated task TT1 will run prior to the main program, and thus assign SPYNUMB the value checked for by the main program; however, such an execution order is not required by the Ada Standard, so the test is erroneous.

- CA1003B: This test requires all of the legal compilation units of a file containing some illegal units to be compiled and executed. According to AI-00255, such a file may be rejected as a whole.

- CA3005A..D (4 tests): No valid elaboration order exists for these tests.

- CE2107E: This test has a variable, TEMP_HAS_NAME, that needs to be given an initial value of TRUE.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